TS1GMMC4

1GB MMCplus

Description

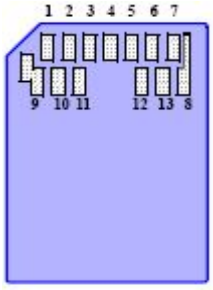
TS1GMMC4 is a 1GB MMCplus memory card. It's a fastest, low-power, highly integration memory card. TS1GMMC4 is designed to provide an inexpensive, mechanically robust storage medium in card form for multimedia consumer applications and mobile devices (handheld PCs, digital cameras, MP3 players, etc.) to store, copy, and move data at high-speed transfer rate.

Features

- Storage Capacity: 1GB
- Operating Voltage: 2.7~3.6V
- Support clock frequencies: 0~52MHz
- Support different Bus width: x1, x4, x8
- Operating Temperature: -25°C ~ 85°C
- Storage Temperature: -40℃~85℃
- Data access mode: Byte mode
- Data Transfer Rate (Maximum): Read:11MB/sec,Write:10MB/sec
- Fully compatible with MultiMediaCard system specification version 4.0 and backwards compatibility with previous specification
- Form Factor: 32mm x 24mm x 1.4mm
- Endurance: 1,000,000 Program/Erase cycles
- MTBF: 1,000,000 hours

Placement

Front



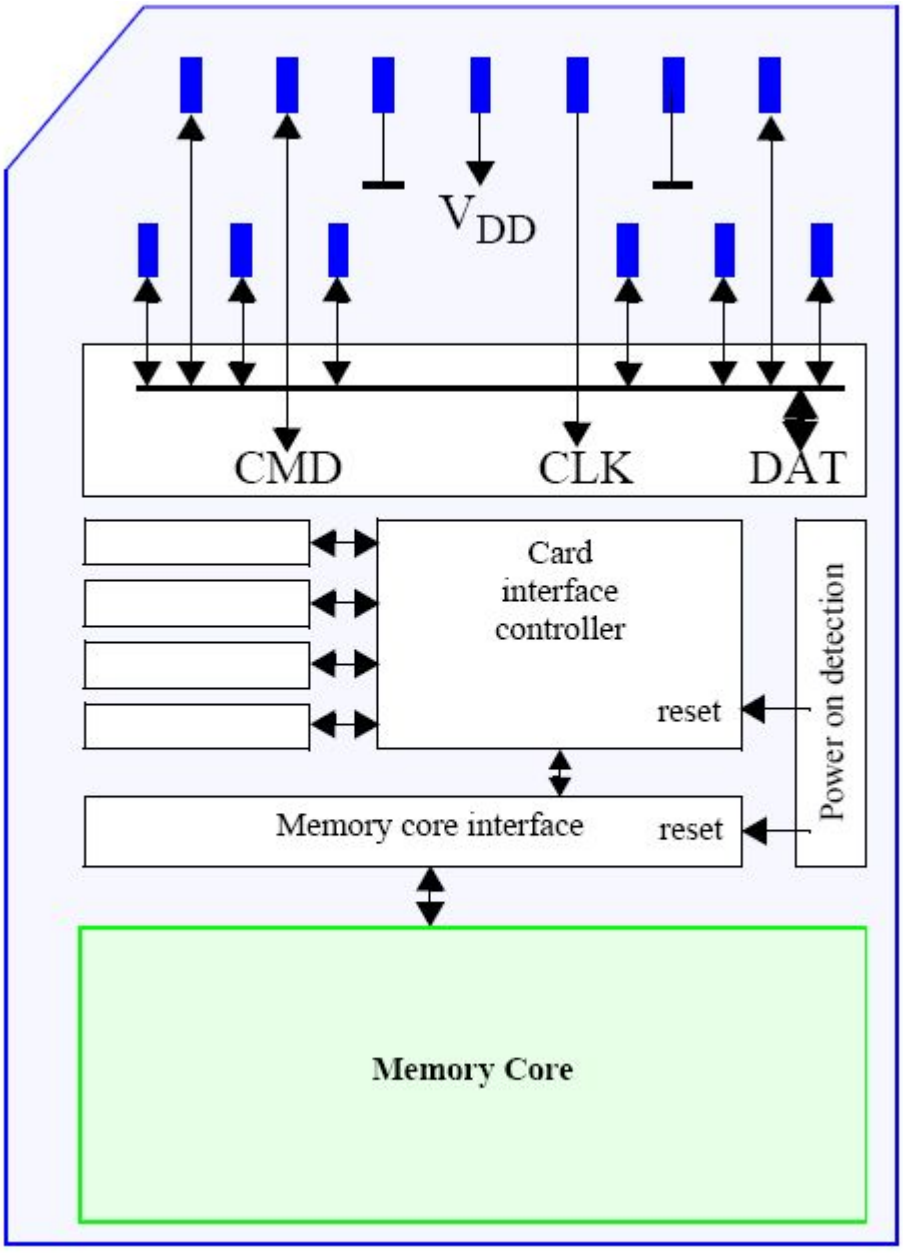
Back

Pin Definition

Pin No.	MMC Mode			SPI Mode		
	Name	Type	Description	Name	Type	Description
1	DAT3	I/O/PP	Data	CS	I	Chip select
2	CMD	I/O/PP/OD	Command/Response	DI	I/PP	Data in
3	VSS1	S	Ground	VSS	S	Ground
4	VDD	S	Power supply	VDD	S	Power supply
5	CLK	I	Clock	SCLK	I	Clock
6	VSS2	S	Ground	VSS2	S	Ground
7	DAT0	I/O/PP	Data	DO	O/PP	Data out
8	DAT1	I/O/PP	Data	Not used		
9	DAT2	I/O/PP	Data	Not used		
10	DAT4	I/O/PP	Data	Not used		
11	DAT5	I/O/PP	Data	Not used		
12	DAT6	I/O/PP	Data	Not used		
13	DAT7	I/O/PP	Data	Not used		

S: Power Supply; I:Input; O:Output; PP:Push-Pull; OD:Open-Drain; NC:Not Connected

MultiMediaCard Architecture



Temperature Characteristics

Parameter	Min.	Max.	Unit
Operating temperature	-25	85	℃
Storage temperature	-40	85	℃
Junction temperature		95	℃

Electrical Characteristics

• Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Power Supply Voltage	V_{CC}	-0.6~+4.6	V
Input Voltage	V_{IN}	-0.6~+4.6	V
Input/Output Voltage	$V_{I/O}$	-0.6~+4.6	V

• Recommended Operation Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	V_{DDH}	2.7	3.3	3.6	V

DC Characteristics

• Power Supply

(Ta=-25℃ to 85℃,V_{DDH}=2.7V to3.6V)

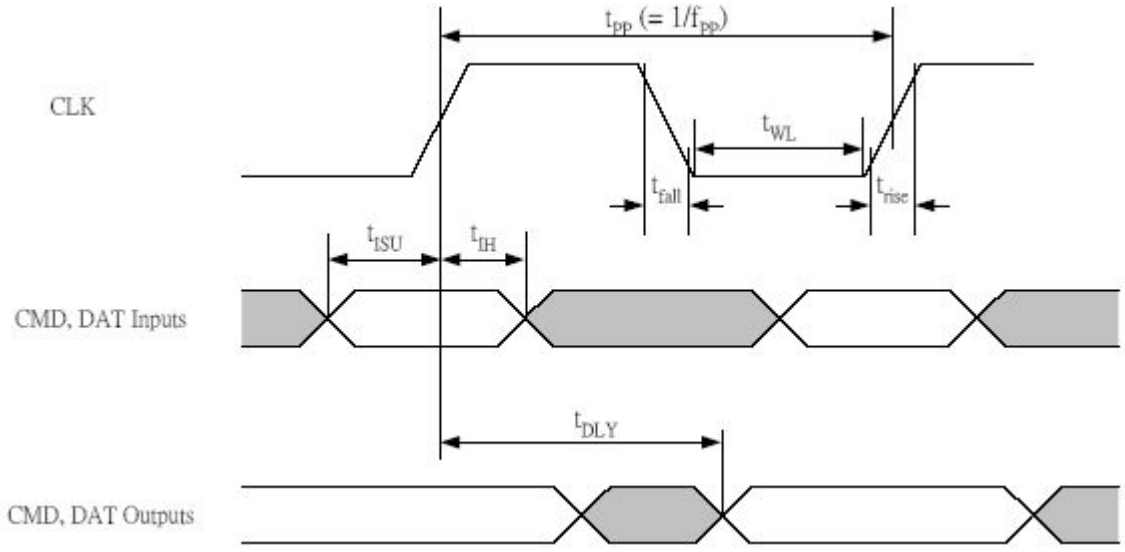
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Output Low Voltage (OD)	V_{ODOL}			0.3	V	I_{OL} =2mA
Output High Voltage (PP)	V_{OH}	0.75* V_{DDH}			V	I_{OH} =-100uA
Output Low Voltage (PP)	V_{OL}			0.125* V_{DDH}	V	I_{OL} =100uA
Input High Voltage	V_{IH}	0.625* V_{DDH}		V_{DDH} +0.3	V	
Input Low Voltage	V_{IL}	-0.3		0.25* V_{DDH}	V	
Operating Current	I_{CC}			20(TBD)	mA	I_{VCCF} =0mA
Stand-by Current	I_{SB}			400(TBD)	uA	
Input Leakage Current	I_{LI}			-10/+10	uA	V_{IN} =0 to V_{DDH}
Output Leakage Current	I_{LO}			-10/+10	uA	V_{OUT} =0 to V_{DDH}
Pin Capacitance	C_P			7	pF	
Power Output Voltage	V_F	1.50	1.8	1.95	V	I_F＜＝240mA

AC Characteristics

• High Speed Card Interface Timing

(Ta=-25℃ to 85℃, V_{DDH}=2.7V to3.6V)

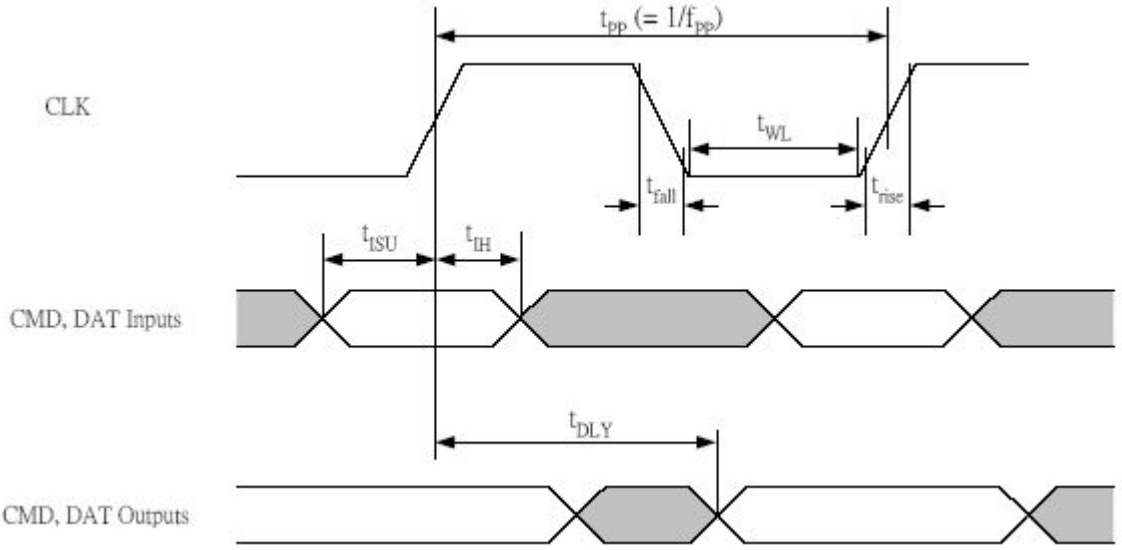
Parameter	Symbol	Min.	Max.	Unit	Notes
Clock Frequency (Data Transfer Mode)	fpp	26	52	MHz	
Clock Frequency (Identification Mode)	f_{OD}	0	400	KHz	
Clock Low Time	t_{WL}	6.5		ns	
Clock Rise Time	t_{TLH}		3	ns	
Clock Fall Time	t_{THL}		3	ns	
Input Set-up Time	t_{ISU}	3		ns	
Input Hold Time	t_{IH}	3		ns	
Output Delay Time	t_{DLY}	5	14	ns	C_L＜＝30pF
Signal Rise Time	t_{rise}		3	ns	C_L＜＝30pF
Signal Fall Time	t_{fall}		3	ns	C_L＜＝30pF



• Backwards Compatible Card Interface Timing

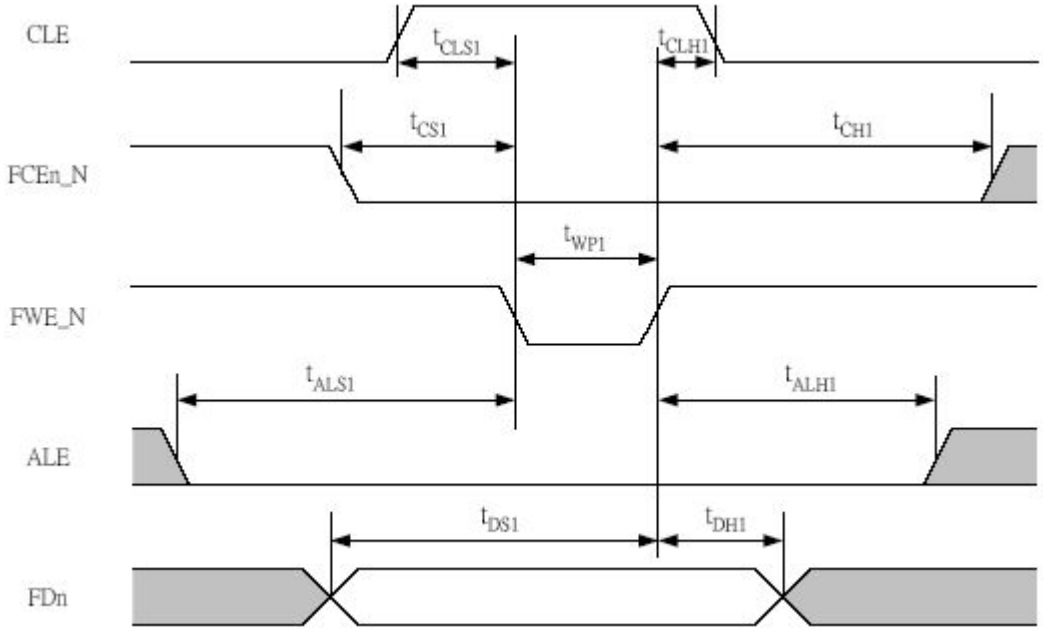
(Ta=-25℃ to 85℃,V_{DDH}=2.7V to3.6V)

Parameter	Symbol	Min.	Max.	Unit	Notes
Clock Frequency (Data Transfer Mode)	fpp	0	20	MHz	
Clock Frequency (Identification Mode)	f_{OD}	0	400	KHz	
Clock Low Time	t_{WL}	10		ns	
Clock Rise Time	t_{TLH}		10	ns	
Clock Fall Time	t_{THL}		10	ns	
Input Set-up Time	t_{ISU}	3		ns	
Input Hold Time	t_{IH}	3		ns	
Output Delay Time	t_{DLY}	9.7	35	ns	C_L＜＝30pF



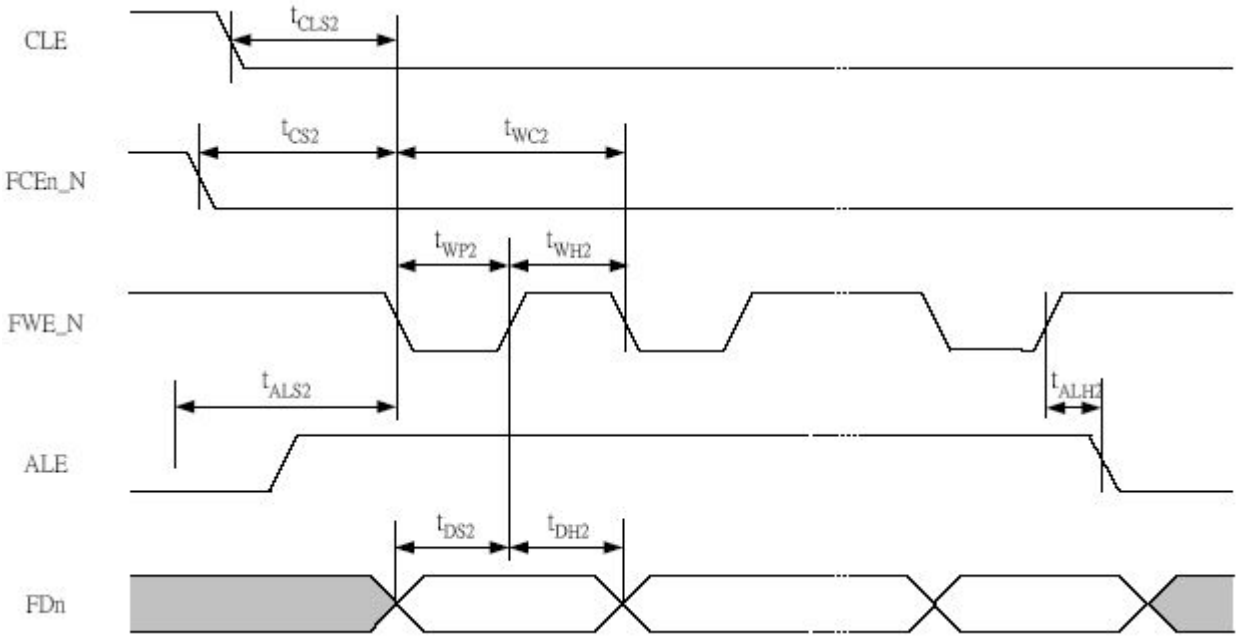
• **Command Latch Cycle**

Parameter	Symbol	Min.	Unit	Notes
CLE Setup Time	t_{CLS1}	30	ns	C_L<=80pF
CLE Hold Time	t_{CLH1}	15	ns	C_L<=80pF
CE Setup Time	t_{CS1}	40	ns	C_L<=80pF
CE Hold Time	t_{CH1}	90	ns	C_L<=80pF
ALE Setup Time	t_{ALS1}	90	ns	C_L<=80pF
ALE Hold Time	t_{ALH1}	75	ns	C_L<=80pF
WE Pulse Width	t_{WP1}	45	ns	C_L<=80pF
Data Setup Time	t_{DS1}	90	ns	C_L<=80pF
Data Hold Time	t_{DH1}	30	ns	C_L<=80pF



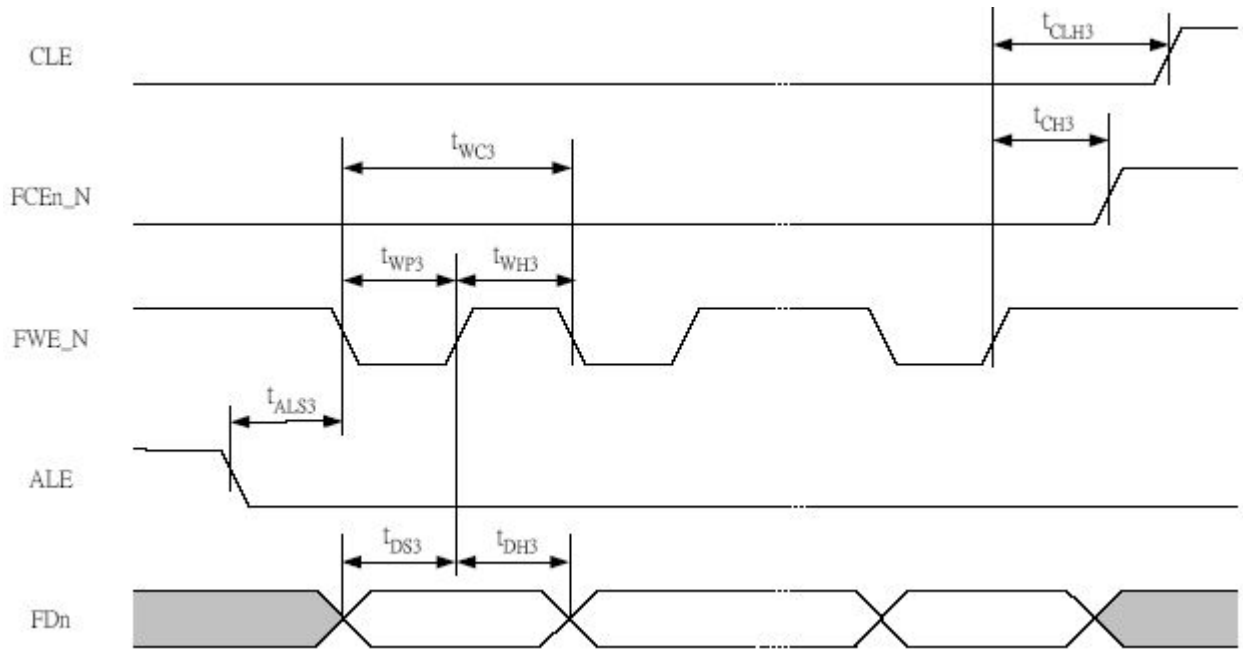
• **Address Latch Cycle**

Parameter	Symbol	Min.	Unit	Remark
CLE Setup Time	t_{CLS2}	90	ns	C_L<=80pF
CE Setup Time	t_{CS2}	195	ns	C_L<=80pF
ALE Setup Time	t_{ALS2}	30	ns	C_L<=80pF
ALE Hold Time	t_{ALH2}	15	ns	C_L<=80pF
Write Cycle Time	t_{WC2}	150	ns	C_L<=80pF
WE Pulse Width	t_{WP2}	45	ns	C_L<=80pF
WE High Hold Time	t_{WH2}	105	ns	C_L<=80pF
Data Setup Time	t_{DS2}	90	ns	C_L<=80pF
Data Hold Time	t_{DH2}	30	ns	C_L<=80pF



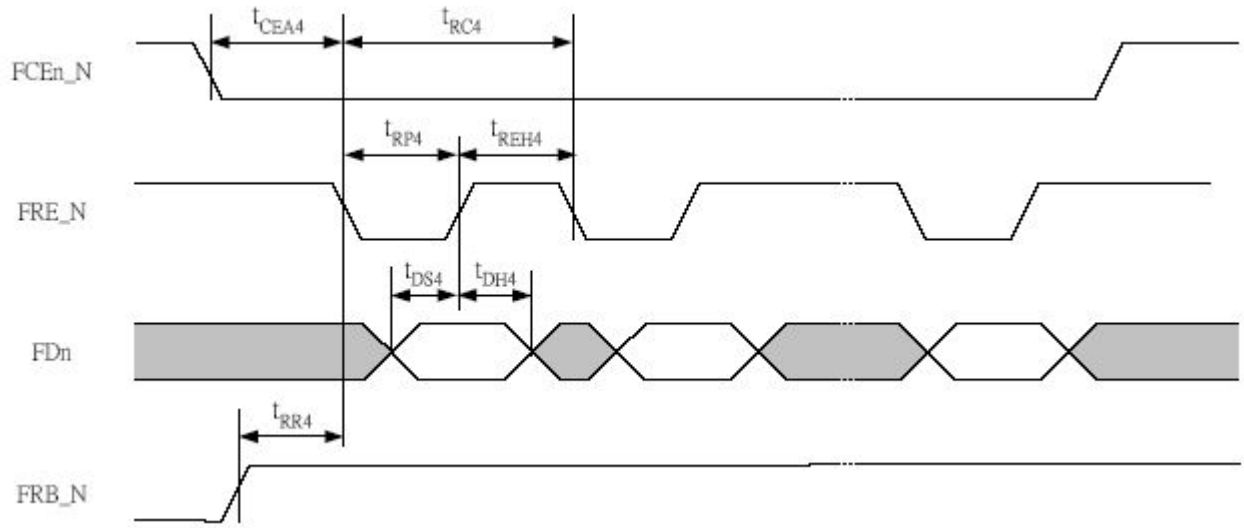
• Input Data Latch Cycle

Parameter	Symbol	Min.	Unit	Remark
CLE Hold Time	t_{CLH3}	285	ns	C_L<=80pF
CE Hold Time	t_{CH3}	195	ns	C_L<=80pF
ALE Setup Time	t_{ALS3}	90	ns	C_L<=80pF
Write Cycle Time	t_{WC3}	60	ns	C_L<=80pF
WE Pulse Width	t_{WP3}	45	ns	C_L<=80pF
WE High Hold Time	t_{WH3}	15	ns	C_L<=80pF
Data Setup Time	t_{DS3}	30	ns	C_L<=80pF
Data Hold Time	t_{DH3}	30	ns	C_L<=80pF



• **Serial Access Cycle after Read**

Parameter	Symbol	Min.	Unit	Remark
CE Access Time	t_{CEA4}	285	ns	C_L<=80pF
Read Cycle Time	t_{RC4}	60	ns	C_L<=80pF
RE Pulse Width	t_{RP4}	45	ns	C_L<=80pF
RE High Hold Time	t_{REH4}	15	ns	C_L<=80pF
Data Setup Time	t_{DS4}	5(TBD)	ns	C_L<=80pF
Data Hold Time	t_{DH4}	5(TBD)	ns	C_L<=80pF
Ready to RE Low	t_{RR4}	285	ns	C_L<=80pF



Reliability and Durability

Temperature	Operation: -25°C / 85°C Storage: -40°C (168h) / 85°C (500h) Junction temperature: max. 95°C
Moisture and corrosion	Operation: 25°C / 95% rel. humidity Stress: 40°C / 93% rel. hum./500h Salt Water Spray: 3% NaCl/35C; 24h acc. MIL STD Method 1009
ESD protection	Contact Pads: +/-4kV, Human body model according to ANSI EOS/ESD-S5.1-1998 Non Contact Pads area: +/-8kV(coupling plane discharge) +/-15kV(air discharge) Human body model according to IEC61000-4-2
Durability	10.000 mating cycles; test procedure: t.b.d.
Bending	t.b.d.
Torque	t.b.d.
Drop test	1.5m free fall
UV light exposure	UV: 200nm, 15Ws/cm² according to ISO 7816-1
Visual inspection Shape and form	No warp page; no mold skin; complete form; no cavities surface smoothness sigma -0.1 mm/cm² within contour; no cracks; no pollution (fat, oil dust, etc.)

Above technical information is based on MMC4.0 standard specification and tested to be reliable. However, Transcend makes no warranty, either expressed or implied, as to its accuracy and assumes no liability in connection with the use of this product. Transcend reserves the right to make changes in specifications at any time without prior notice.